Although no explicit statement is made, the reader is apparently left to infer that there are two modes of origin of a hollow stele: (1) one in which the central tracheids are replaced by parenchyma (Schizaea), (2) one in which fundamental tissue passes into "pockets" at the leaf gaps and becomes continuous with the tissue in contiguous pockets (Alsophila). Although the latter view of the origin of "pith" is essentially that of JEFFREY, no mention of the fact is made in the text, but such reference is relegated to the preface, where the author disclaims adherence to this view. The evolution of solenostely into dictyostely, and finally into polycycly is clearly traced, and the complicated condition found in Marattiaceae is adequately illustrated by diagrams from various sources.

Concerning the Osmundaceae, the conclusion is reached that the stele does not represent a reduced type, but shows a gradual progression from the condition seen in Botryopterideae, from which group the Osmundaceae have probably been derived. The recent work of KIDSTON and GWYNNE-VAUGHAN on fossil members of the group is quoted in defense of this position.

In a succeeding lecture the evolution of the leaf-trace is outlined, and it is shown that elaborations of the primitively simple curved trace follow upon increase in the leaf-surface, and in turn bring about increasing complexity in the central cylinder of the stem. According to the author's view "the leaf-trace leads, and the stele follows, in the course of evolution." The ontogeny of the vascular system is next summarized, and a final lecture is devoted to a comparison of the vascular system of various phyla. The criticisms of JEFFREY'S primary groups Lycopsida and Pteropsida have already been dealt with in this journal[2].—M. A. CHRYSLER.

The American Breeders' Asssociation

The fourth annual report of the American Breeders' Association[3] is, in a number of features, a decided improvement over previous volumes. The same high standard of matter is maintained as in previous reports, but there is more of it; it is printed on better paper; and contains numerous fine half-tone engravings. Unlike many publications which are more or less influenced by practical considerations, the articles presented in the reports of the American Breeders' Association appear to suffer no diminution of scientific value because of the large contingent of practical breeders among its membership and on its programs. Almost every phase of practical and theoretical breeding of plants and animals, as well as two interesting reports upon eugenics, the new science of improvement of the human race, are included. Papers of importance from the standpoint of the practical plant-breeder include several upon the production of disease-resistance in various plants by W. A. ORTON, P. K. BLINN, and H. L. BOLLEY;

[2] JEFFREY, E. C. Are there foliar gaps in the Lycopsida? BOT. GAZETTE 46:241–258. *pls. 17, 18.* 1908.

[3] Report of the American Breeders' Association. Vol. IV. pp. 373. *pls. 3, figs. 74.* 1908.

the improvement of apples and other tree and vine fruits, by S. A. BEACH, W. T. MACOUN, and J. A. BURTON; the breeding of cereals by L. S. KLINK and C. E. SAUNDERS; the improvement of hops by selection and breeding by W. W. STOCKBERGER; on cotton-breeding by DAVID COKER, H. J. WEBBER, and D. A. SAUNDERS; the breeding of fiber crops, by J. H. SHEPPARD, L. H. DEWEY, FRITZ KNORR, and H. L. BOLLEY; the breeding of vegetables, by W. W. TRACY; roses by PETER BISSETT, and W. VAN FLEET; tobacco by A. D. SHAMEL, J. B. STEWARD, A. D. SELBY, and W. H. SCHERFFIUS; carnations by C. W. WARD; forage crops by T. F. HUNT and H. S. ALLARD; and forest and nut trees by GIFFORD PINCHOT, W. L. JEPSON, and G. L. CLOTHIER. In all of these articles, as well as in a number dealing with animal breeding, there are many facts recorded which are of more than passing scientific interest. Papers of a more strictly theoretical scientific character are: "Organic correlations," by E. M. EAST, "Some gaps in our knowledge of heredity," by H. J. WEBBER, "The composition of a field of maize," by G. H. SHULL, "Recent advances in the theory of heredity," by C. B. DAVENPORT, "Color factors in mammals," by W. J. SPILLMAN, and "Mendelian phenomena and discontinuous variation," by W. J. SPILLMAN. The wide range of subjects and the almost uniform high excellence of the papers and reports included in this volume show that the American Breeders' Association has a large mission to fill, and that it is filling it creditably. These annual reports are made the treasure-house of all the best things gained in the experience of our foremost practical breeders and students of heredity during the progress of their work. The efforts made by the practical breeders to present their experience in as proper scientific form as possible, and to interpret those experiences in the light of the latest scientific results, and the efforts of the scientific breeders to state their results in as simple, direct, and comprehensible a manner as possible, have a most salutary effect upon all those connected with the American Breeders' Association, and must continue to supply us with the best annual crops of information regarding the factors which enter into the breeder's work, whatever may be his motive in breeding.—GEORGE H. SHULL.

MINOR NOTICES

Sertum Madagascariense.[4]—This paper is based on two collections of plants made in Madagascar, one by JOHN GUILLOT in the district of Vatomandry on the east coast and the other by HENRI RUSILLON on the plateau of Imerina. The first part of the work consists of a brief consideration of the botanical geography; and in the second part the author in collaboration with several prominent European specialists, gives a list of the species. Among the plants recorded 26 species and 4 varieties are described as new to science. The larger and more critical genera are accompanied by analytical keys to the species, and several text-figures have been introduced. A complete index to the vernacular and scientific names is also

[4] HOCHREUTINER, B. P. G., Sertum Madagascariense. Ann. Conserv. et Jard. Bot. Genève 11–12:35–135. *figs. 23.* 1907–1908.